

## A SHAPELESS HOSPITAL, A FLOATING THEATRE AND AN ISLAND WITH A HILL: Venice and its invisible architecture

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### **Abstract**

*Architecture is often charged with narrative content; it foregrounds certain elements and underplays others; it constructs space, time and sequence; it facilitates the exploration of identity according to the specificity of the context in which it is embedded. But what is interesting in architecture is how these mechanisms are used not to tell stories, but to engage the imagination and arrive at a creative formation. This paper looks at two unrealised projects in Venice (Alvise Cornaro's proposition for the Bacino San Marco, 1560, and Le Corbusier and Jullian's Venice Hospital, 1964) and the urban morphology of the city. It identifies two main questions: (1) How does the urban morphology of Venice influence the configuration of the two works? (2) What contribution can the analytic discipline of space syntax make to architecture and design in addition to evaluation how spaces function for social purposes? The paper argues that the spatial structure of Venice influences the two projects based on a foreground network of canals that is independent but also intersects with a foreground network of streets and squares. The dual function of squares to 'bridge' between the two networks together with their strong architectural qualities makes them recognisable as focal points - in which one is locally situated - and as points which one traverses in through-routes from origins to destinations. The study shows that space syntax can inform abstract comparative knowledge of configurational possibility used in architecture and design in which configuration can be abstracted from one spatio-temporal system and transformed into a new reality.*

## 1. TWO UNREALISED PROJECTS IN VENICE

The 16<sup>th</sup> century in Venice saw a development towards the age of technology, and brought together many protagonists over the debate on hydrology in the lagoon. Cristoforo Sabbatino and Alvise Cornaro's proposals differed significantly (Tafuri, 1989, pp. 138-160). Sabbatino proposed to protect the shores, deviate the river currents, remove obstacles to allow sea-water to enter Venice, and use the deposited mud to produce new lands for suitable building. Alvise Cornaro on the other hand, saw a limitation to urban development and a subsidization of land reclamation by the State. Cornaro had increased the value of his patrimony based on his entrepreneurial skills on hydraulics, reclaiming wetlands for farming. He had a strong interest in theatre, and having failed to be recognized as a Venetian patrician lived in Padua '*with a secret nostalgia for a lost paradise*' (ibid., p. 143). This background explains his proposal for the Baccino San Marco comprising: an antique theatre (in the lagoon, in between the Giudecca and the Custom House Point), a fountain of fresh flowing water drawn from the Sile or the Brenta (in between the columns in the Piazzetta), and an artificial hill island with an open loggia at its summit (on the canal channel between San Giorgio and San Marco) (figure 1). The theatre prefigured Palladio's *Olimpico* in Vicenza, and had its roots in the tradition of the Venetian *teatri di mondo*. Cornaro envisioned it as a site of spectacles, as well as a spectacle in itself, while all three elements in the project could be appreciated '*from the greater theatre of the Serenissima, that is to say the Piazzetta*'<sup>1</sup> (ibid. p. 148).



Figure 1

<sup>1</sup> '*...and this edifice will be seen when one is standing in the Piazza San Marco and it will be a very beautiful view and an edifice of a type that is no longer found in any other City, for where they were, they have fallen apart...and the hill will be planted with trees, ...and at its summit there will be a loggia...; and one will see this hill standing in the piazza, where there will also be a fountain of fresh flowing water; and thus in one glance one will see fountain, hill and theatre, and between them many large ships...and this will be a spectacle,....*'. (quoted in Tafuri, 1989, p. 146).

Cornaro's plan was linked with another exceptional proposition: to surround the Venetian lagoon with fortifications and use them for public parks and gardens. This proposition was influenced by the awareness of new possibilities from the New World, and more particularly, by Tenochtitlan, which had a morphology that was similar to Venice, and an aqueduct that resolved the problem of fresh water (ibid. p. 153). However, the idea of surrounding Venice with walls was absurd. The waters were Venice's walls. In 1561 Francesco Sansovino made the following statement: 'As Venice is an impossibility, therefore, she came to be placed in the impossible, being founded in the sea, because in this respect she is unlike all other cities' (ibid. p. 155). For Tafuri, this meant that '*Venice a utopia that has become reality, has no need of utopias* (ibid.). Dated around 1560 Cornaro's project challenged the cautiousness of Venetian ruling class by making a significant mark in the lagoon that was presented not as technical knowledge but as '*a fantastic inspiration*'<sup>2</sup> (ibid. p. 158).

In 1964, Guillermo Jullian de la Fuente, a young Chilean architect, who was working for Le Corbusier, lead the team that travelled to Venice for field research and for presenting the Venice Hospital project to the Venetian authorities. Earlier in 1962, Jullian had selected from a botanical treatise a picture that showed a cell splitting into four new nuclei and drew it over the plan of the Olivetti factory workshop<sup>3</sup> (Allard, 2001, p. 22). Superimposed over a precise industrial building, the organic form was the nucleus of the idea to liberate a building from rigid boundaries. A year later, in his trip to Venice Le Corbusier declared to Giuseppe Mazzariol that doing a hospital in Venice would mean that one could not build high and 'it would be necessary to build without building' (Mazzariol, 1966, p. 241). Le Corbusier presented the project on pilotis like Palazzo Ducale, and developed what many critics consider an example of a *mat-building*, that is a building without walls between itself and the city. The Venetian authorities enthused over the horizontal arrangement of the volumes that left the silhouette of the city unchanged, and the possibility for an extendable hospital (figures 2a-d).

In 1974 in her article *How to Recognize and Read Mat-building: Mainstream Architecture as It has Developed Towards the Mat-building*, Alison Smithson defined this new type as the epitome of the '*anonymous collective; where the functions come to enrich the fabric, and the individual gains new freedoms of action through a new and shuffled order, based on interconnection, close-knit patterns of association, and possibilities for growth diminution and change*' (Smithson, 1974, p. 573). Smithson used examples from vernacular and modern architecture to illustrate this typology, including Le Corbusier and Jullian's Hospital in Venice. Le Corbusier saw Venice as a cardiac system, a testimony to functional precision, *intersecting but also separating the waterways from the pedestrian routes* (Le Corbusier on Venice, Architecture at Rice, 23 p. 9). In the *Rapport Technique* - the technical document of the Hospital - he associated the origin of the design idea in the city, calling the paths that link four care units *calle* (street), and the central space of

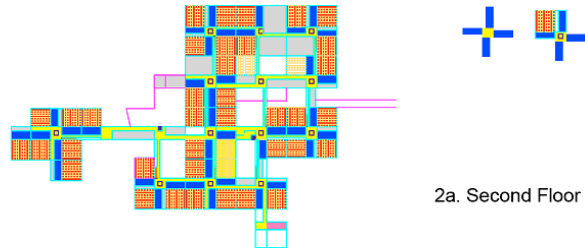
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<sup>2</sup> For Tafuri, Cornaro's project was challenging the conservative and providential empiricism of the Venetian Republic, which had pushed Palladio's bold innovations to the margins of Venice (ibid., p.140).

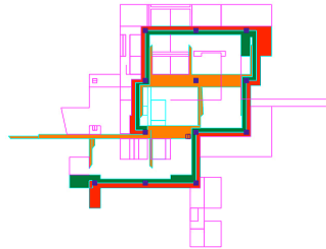
<sup>3</sup> As Jullian wrote in *Notes sur Royaumont*:

A 'cuore' has tried to be found  
A place into which the city pours in  
.....  
...every step in the city must be 'cuore'  
.....  
Opening to all solicitations  
And variabilities of the citizen  
And concrete acts, precise and definite  
Incorporated to this reality  
(Allard 2001, p. 22).

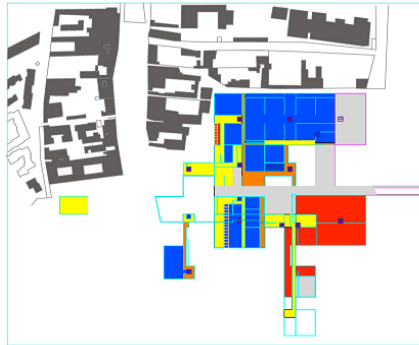
communication between these units *campiello* (square) (figure 2). He wrote: *'through the projective juxtaposition of building units... the hospital stops being a static organism and acquires the flexibility required both to follow the medical innovations and to accommodate the possibility of future growth'* (Le Corbusier, 2001, p. 42).



2a. Second Floor



2b. Mezzanine



2c. First Floor



2d. Ground Floor

Figure 2



A site plan published in Le Corbusier's *Oeuvre* shows the hospital behind the station and a selection of other buildings in Venice (figure 3). Through a continuous flow along the the Grand Canal dotted by *Pallazzi* and the Rialto market, the drawing links the Hospital with Palladio's San Giorgio Maggiore, via the *Merceria* and San Marco. Le Corbusier had always aspired to design a public building in Venice comparable in scale and impact to that of Palladio's convent, the grand piazza and the *Ospedale Civile*<sup>4</sup>. Palladio, in his *I Quattro Libri Dell'Architettura* - published in Venice in 1570 - described the convent as a monastery intended for the recreation of the houses of the ancients (Howard, 2005, p. 192). Like Soane at Agrigento, Le Corbusier had frequently measured himself against classical architects (Woodward 2001, p. 175). Thus, the march from the service yard to the embellished front of the city and to San Giorgio Maggiore in this map, expresses the architect's heroic entrance in Venice and the house of the ancients.

Planned on a site of a slaughterhouse in San Giobbe neighbourhood in the Canaregio Sestiere, the hospital project was for the acutely and terminally ill. Poignantly, it marked Le Corbusier's sudden death while swimming at Cap-Martin on August 27, 1965. The team continued working under Jullian's direction on a design that took more than nine years to develop, and like Cornaro's project was never built.



Figure 3

<sup>4</sup> The Venice Hospital by Le Corbusier, *Architecture at Rice 23* by Guillermo Jullian de la Fuente, p. 5, <http://www.archive.org/details/venicehospitalpr23jull>.

## 2. ARCHITECTURE AND THE IMAGINATIVE CHARGE

Le Corbusier's site plan has narrative content; it selects features of Venice leaving some out in favour of others. It represents time, space and sequence; it facilitates the remembrance of old structures and the expression of identity; it endows its representations – the old and new buildings - with causality; it envisages an end – the arrival at San Giorgio Maggiore; and it does all these according to the specificities of the context in which it is embedded (Cobley 2001, p. 228). However, the interest in architecture is less in telling a story, and more in the ways in which a building or plan is imaginatively constructed. The question this paper raises is: *How do Cornaro's reconfiguration of the Bacino, and the Venice Hospital engage with Venice, and how do they use the city to derive inspiration?*

A comparison between two projects that differ significantly in terms of programme and period has obvious limitations. However, the two schemes serve as paradigmatic examples of antithetical concepts facilitating not a comparison but a parallel discussion. The former surrounds Venice with walls. The latter claims to be without walls, or a building that is like a city. Fortifying Venice, Cornaro opposes the reclamation of new land, expressing a fixed notion of time. Le Corbusier and Julian on the other hand, evoke an evolutionary concept of time based on the flexible expansion of the Hospital. Both works are examples of utopian thinking. Cornaro's proposition is associated with the landscape genre of utopia, seeing Venice and the lagoon as a floating garden (Tafuri, 1981, p. 158). Le Corbusier and Jullian's scheme on the other hand, is related to the visionary paradigm of networked and flexible cities developed in the 1960s. More importantly, both design were inspired by Venice, which have come to express the imaginative charge, the *extraordinary encounter between organic patterns of growth and systemic human intent* in terms of social and political structures, multi-cultural influences, works of art, architecture and spatial organisation. *If Venice inspires these works of architecture, it is interesting to know how the spatial configuration of the city affects these works resulting in creative transformation.*

## 3. A STAR-SHAPED THEATRE: ALVISE CORNARO'S PROPOSAL

In his description of his proposal for the Bacino, Cornaro stresses that 'in one glance one will see fountain, hill and theatre, and between them many large ships, which will then be able to enter the port; and this will be a spectacle...' (Tafuri. p. 150). Drawing the frontal and diagonal sight lines from each structure to all others in the lagoon<sup>5</sup> we see that all cluster around a convex space (figure 4). Thus, they are not only co-visible from the Piazzetta, but also inter-visible from all other points in the Bacino at once. Cornaro inserts a floating theatre into the basin, but also turns the basin into a theatre in its own right. In this way, the theatre that is Venice contains a theatre that is the Bacino that contains a floating theatre. Similarly, the island that is Venice contains a hill-island that contains a loggia. The floating elements are metonymic expressions of the city, so that Venice contains its own copies. This strategy of duplication and reduplication establishes self-similarity in contraction. Cornaro completes a hydrological process that took place over hundred of years. But instead of growing Venice outwards, he separates it from the sea, and grows its own presentations in the interior.

It is important to stress that San Marco and the Bacino were expressed as the centre of an ideal cosmography in many maps (Tafuri, 1981, p. 142-143), including the woodcut area view of Jacobo de Barbari (dated around 1500). Venice had at least two important centres – the commercial centre at Rialto and the

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<sup>5</sup> The Procuratoria Nuova, La Biblioteca Marciana, the Ducal Palace, the Custom House Point, the Benedictine church that stood in the place of Palladio's San Giorgio Maggiore - that started in 1565 - the theatre, and the hill island.

civic centre at Piazza San Marco (Howard, 2002, p. 48). Cornaro's work however, focuses on the symbolic centrality of the Piazza and reinforces it further with the new structures he places in the lagoon. For Tafuri, his project is reminiscent of principles of Renaissance landscape design, and was inspired by the 'fabulous recollections' of *Hypnerotomachia Polifili*, which was published in Venice in 1499 – turning the lagoon into a garden (ibid.). Cornaro's reformulation offered a functional service, addressing hydrology, ecology, fresh water, and public works; but it was presented as a playful utopia and a literary topos, reinforcing the theatre of Venice in the Bacino. While his technical skills were 'called upon to make a deep mark on the city's appearance', they 'were sublimated, which also made them different from the severe and pleasureless technology employed by Cristoforo Sabbatino' (ibid. p. 152). If the city was an impossibility made possible, Cornaro seems to suggest, it was because it saw no dichotomy between operational strategy and aesthetic expression. Venice contained its own imagination in its form and theatre of everyday life. This, he seemed to imply, was its true *centre*.

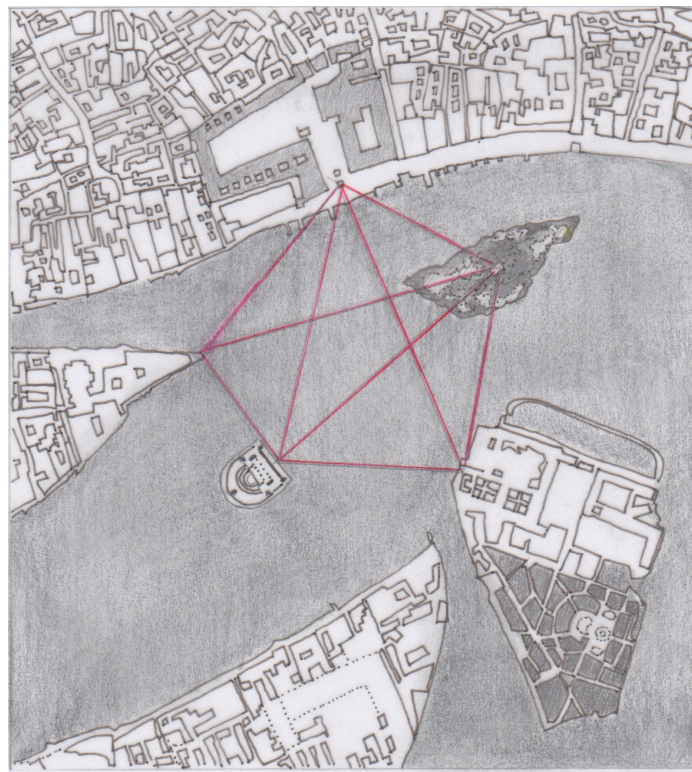


Figure 4

#### 4. LE CORBUSIER AND JULLIAN'S VENICE HOSPITAL

##### 4.1 Rapport Technique

The plan of the Hospital (1964) consists of a series of squares, arranged in a radial pattern around a central space, and interconnected into a matrix (figure 2a, figure 5). Each square accommodates a different treatment unit, from the gynaecology and paediatrics at the front to the neurological unit at the rear left of the complex. The organisation of the programme is determined not only in plan but also in section with the patients' area situated on the top of the building, and all the other activities found below. A service mezzanine (figure 2b) facilitates through conduits sterilization services and ramps the communication of the

patients situated on the top floor with surgery, radiotherapy, pharmacy and the doctors' offices on the first level (figure 2c). The first floor also houses emergencies, diagnostics, a free clinic, maternity ward, laboratories, theatre and morgue. Finally, the ground floor (figure 2d) accommodates the entrances, administration, services, arrival by boat, ambulance access, and a chapel situated directly on water, a landmark and 'link to the island cemetery of San Michelle' (Allard, 2001, p. 26).

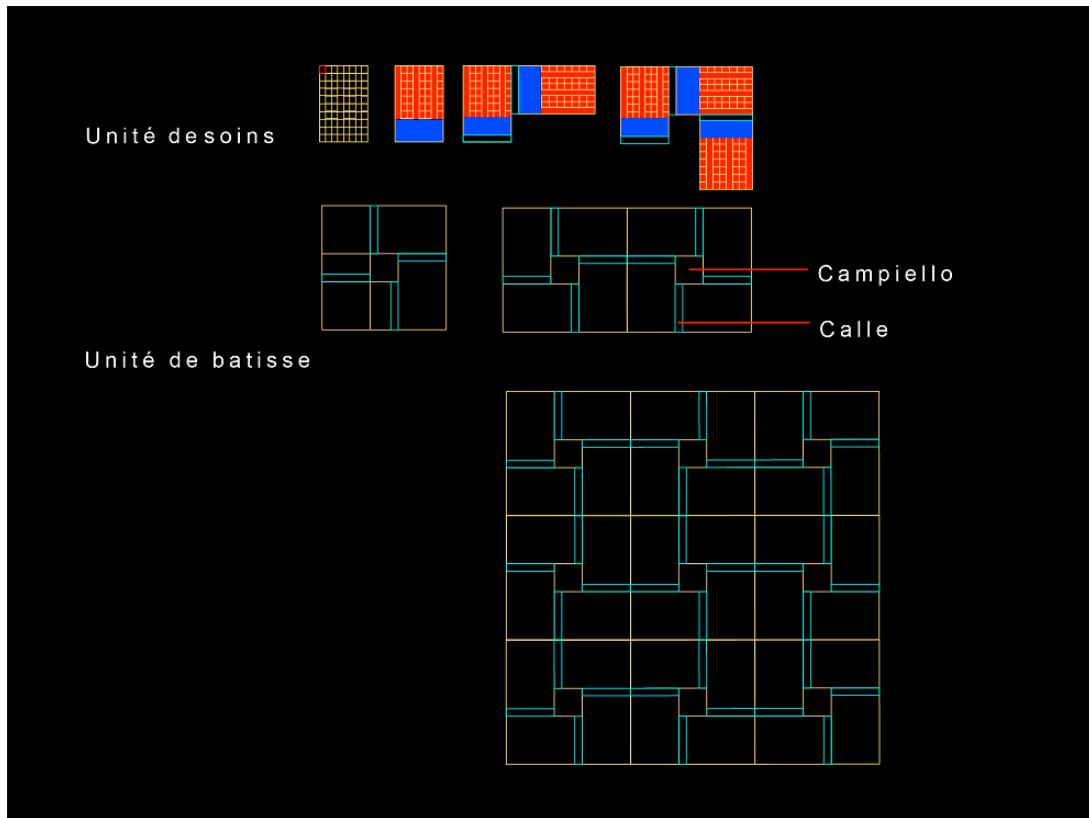


Figure 5

*The Rapport Technique* - the technical document of the project - explains that the point of departure of the design is the *cellule*, or the room of the patient. 'This element gives rise to the "care unit" [Unité de soins] of twenty-eight patients, which functions autonomously. This unit is organised around a central space of communication (Campiello) and four paths (Calle), which are intended for both inhabitation and circulation by patients in convalescence. Four units of care form a "building unit" [Unité de batisse]. Through the progressive juxtaposition of building units, this framework yields a horizontal hospital' (Le Corbusier, 2001, p. 42). The entire third floor was designed so as to provide 'the same conditions of city life, upon entrance into the "Calle", the "Campiello" and the hanging gardens' (ibid.). This system was claimed to have the flexibility to accommodate growth, future medical innovations as well as an effective and economical cure built around the preventative and rehabilitation capabilities of the hospital. 'By opening the ground floor directly onto the city, one allows for a city-hospital encounter and facilitates the visual transmission of medicine toward the outside' (ibid.). The technical document also stresses that it was 'above all man, rather than the patient, who is being considered. This is to say that the scale of construction had to be found at the level of humanity: the *cellule*, and everything that it comprises, is the primary element upon which the entire conception of the hospital is articulated. The Unité de soins, the Campiello and the Calle serve to create relationships between the patient and the city (ibid.).

Intertwining number, geometry, space, programme and the city, the Rapport Technique advances a description not only of the technical dimensions and the functionality of the building, but also of the compositional strategy and the ways in which it articulates meaning (figure 5). By placing emphasis on the modular logic from the patient's cell to the building complex, it conflates the idea of organic growth with the evolution of medical knowledge. By defining the cell as an elementary cellular unit, it expresses the patient as universal man and the Hospital as the realm of humanity. The Modulor man depicted on the plan (figure 6) facilitates a direct link with the idea of Humanism rooted in Italy and Venice. Finally, by linking the *Unité de soin* with the *Campiello* and *Calle* it establishes an unequivocal link between the typological dimensions of the spaces in Hospital and squares and streets of Venice, including an egalitarian, anti-institutional attitude with its emphasis on the direct encounter between the patient and the city. But if these properties facilitate *signification* expressing urban growth, flexibility and communication between Venice and the building, the interest is to understand how the Hospital articulates *significance*, that is, at the level of its own spatial characteristics (Hillier 2011, p. 126), and if it is at this level that a relationship is constructed between itself and the city.

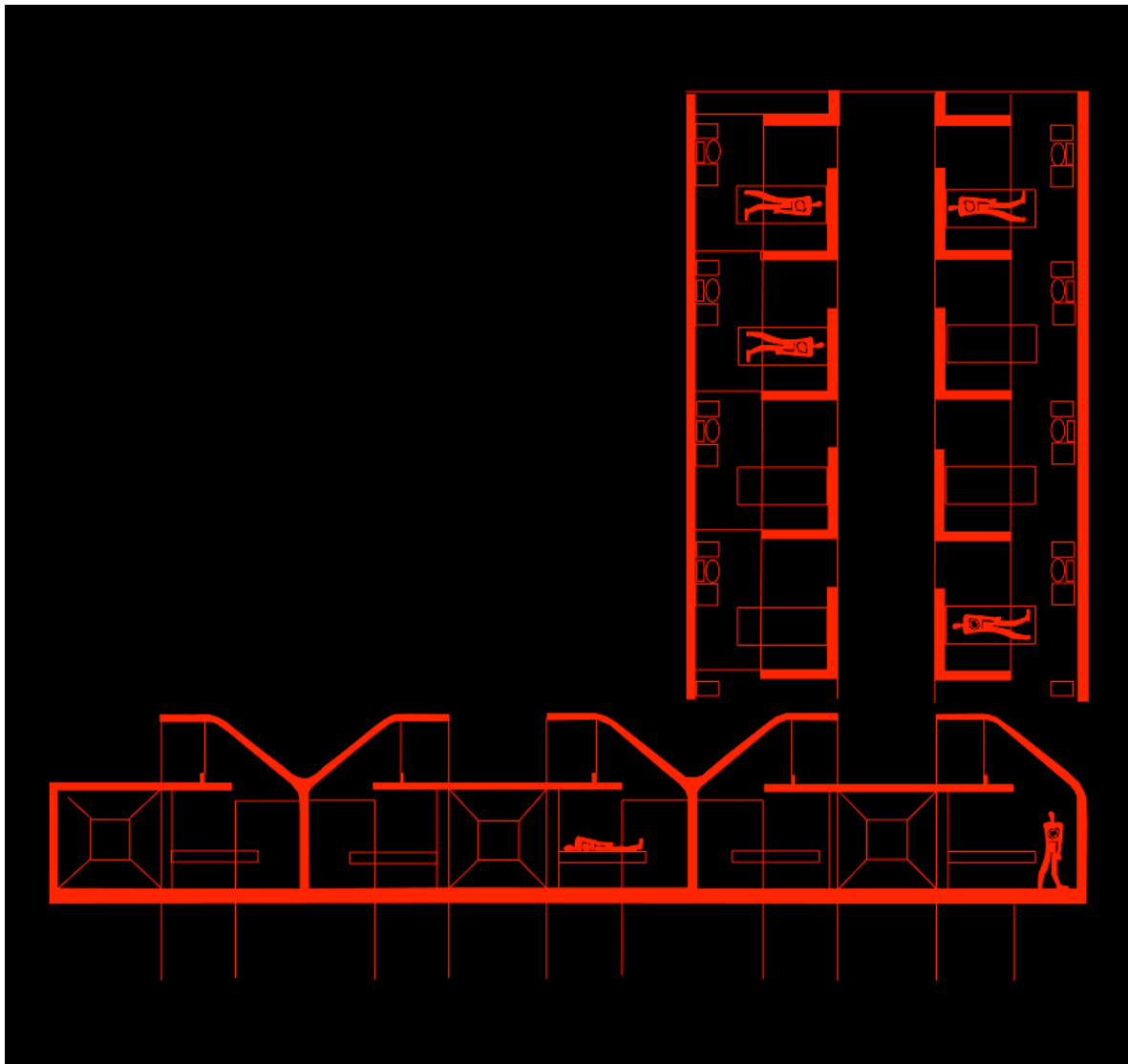


Figure 6

#### 4.2 Functionality and the Hospital-City Encounter

The axial analysis of spatial integration of the entire building shows that it is well integrated both in terms of internal organisation and its relationship with the exterior (figure 7). This is due to the large number of horizontal and vertical links that establish large-scale spatial connections in each floor and from the third floor to the ground level. Based on space syntax research on hospitals and other complex building types, (PenDesyllas, 1999, Haq and Zimring, 2001, Penn et al. 1999, Penn 2005, Peponis and Hillier, 1982, Peponis et al. 2007), it is possible to suggest that the distribution of integration in the building is an indication that the architectural intentions to create a strong city-Hospital encounter, and good levels of collaboration among members of staff were likely to be met by the design. Based on research on large-scale buildings and



Figure 7



diverse building types resembling urban systems, it is also possible to say that the Hospital would fulfil the requirements of generic function (Hillier, 1996, p. 255) generating an emergent large field of encounters and a spatial culture of social co-presence.

Significant as these characteristics are in explaining the functionality and the configurational logic of the building, a description of architecture that focuses mainly on functional performance cannot account of the way in which inspiration for the Hospital originated in the city. Central to this question is how the Hospital relates to mat-building. Through the meshed modular structure, expandability, and the strong links with the urban fabric, the design seems to be an example of this type. However, a number of authors have stressed that it is not another instance of mat typology (Allard, 2001, p. 30, Addington et al. 2001, p. 74). For Julian, it was not the typology of the design that mattered, but its 'poetic integration' to the essence of Venice. This essence was discovered '*not in the drawing board, but through [Le Corbusier's] eyes, his hands, and even his feet, that is, by observing and going throughout it for a long time*' (Jullian quoted in Allard, *ibid.*). As for Le Corbusier, he explained he had invented nothing; inspiration for the Hospital was contained in the logic of the terrain on which it was to be founded<sup>6</sup> (Mumford, 2001, p. 58).

## 5. VENICE: EVOLUTION AND URBAN FORM

Of the early appearance of Venice in the lagoon little is known. What is established though is that the churches were the earliest permanent structures on land that was reclaimed little by little, as areas were drained and navigation channels were excavated (Howard, 2002, p. 4). The earliest known map (dated around 1346) shows that the city had already formed a compact 'land-mass' and was criss-crossed by canals. The churches are the only buildings shown in this map, the majority of which is still standing in the same places today. Removing all information but the churches and squares from today's map of Venice reveals a collection of open spaces and monuments scattered in the lagoon (figure 8a-b). However, the measure of least angle choice at a series of local-scale radii (250-1500 metres) shows that what appears to be a random distribution has a clear logic, since they are all interlinked by the foreground network of 'through' movement (figure 9a-d).

This network can capture the logic of early social and economic activity as well as a possible pattern of evolution of the city. Deborah Howard suggests that the churches, squares and the houses built around them were the urban and social nuclei of parish islands that dotted the archipelago (figure 8a). She explains that 'each parish was built up street by street around its own church and campo' (2002, p. 50). The gradual development of the mercantile society generated the need for quick water and land transportation, until through a long process of land reclamation the islands were joined up (*ibid.* p. 51). In his study of civic rituals in Renaissance Venice, Muir suggests that the islands had their own 'rich and influential families, patron saint, special feasts, customs and defined border', including considerable autonomy over local affairs (1981, p. 146). Thus, the urban structure of Venice consisted of 'semi-autonomous communities, each serving as a microcosm of the city as a whole' (*ibid.*, p 148). These accounts and the analysis of Venice suggest that each parish square (or campo) was a community centre. This centre contained a church and a market that was primarily serviced through their proximity to water. In addition to these functions, the campi facilitated water collection, as a system of gutters and underground channels collected and directed rainwater to

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<sup>6</sup> Mumford explains that Le Corbusier described the 'city as a "witness" to the possibilities of urbanism conceptualized as a dense interconnected structure of pedestrian ways, canals, and built fabric. He said of the hospital design, "The city of Venice is there and I have followed. I have invented nothing"'. (2001, p. 58).

cisterns at the centre of each square (figure 10). The continuous network of local scale routes captured through least angle choice indicates that in the process of land reclamation the streets leading from the campi met those of another, producing a network of multiple interconnected centralities.

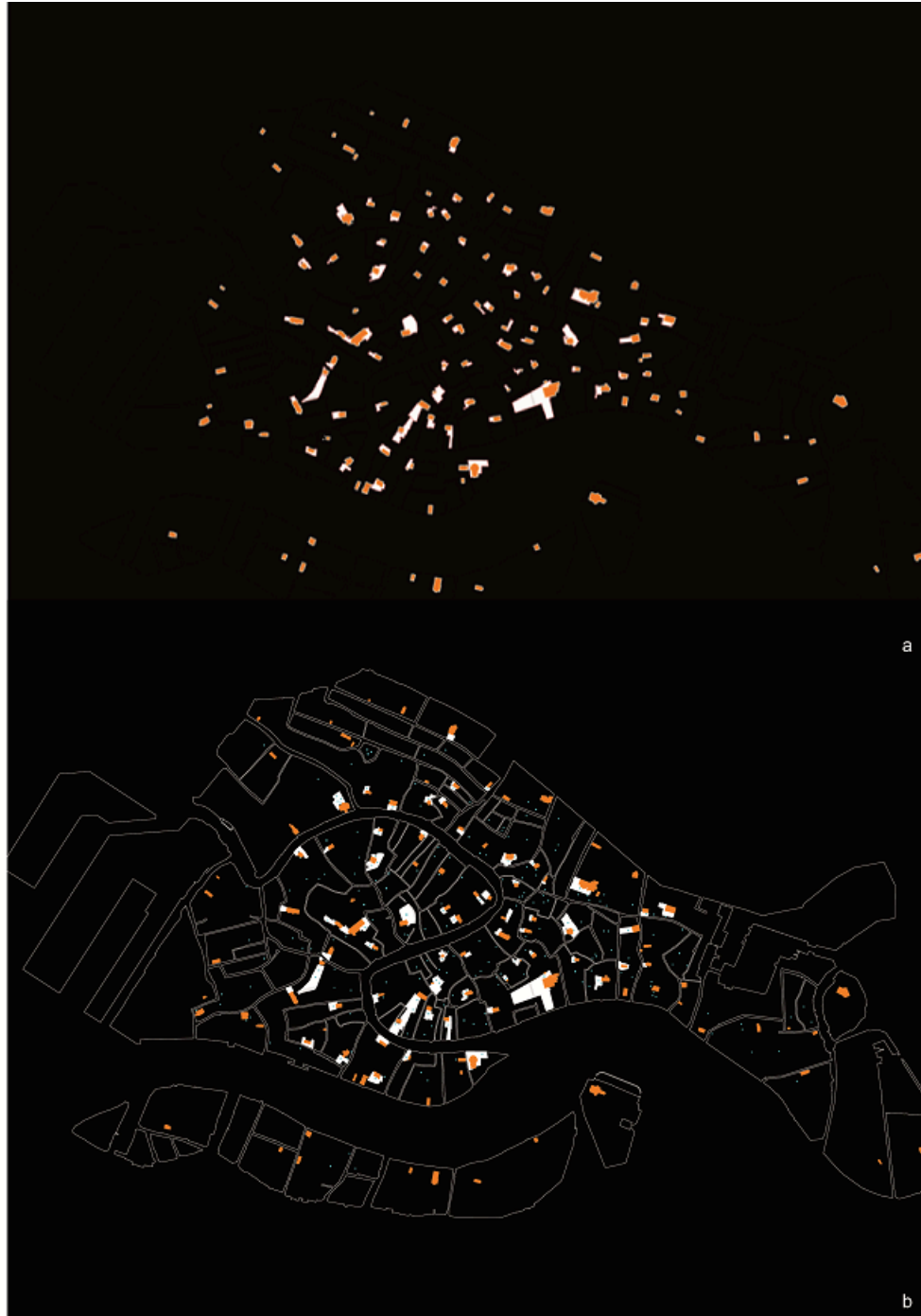


Figure 8a-b

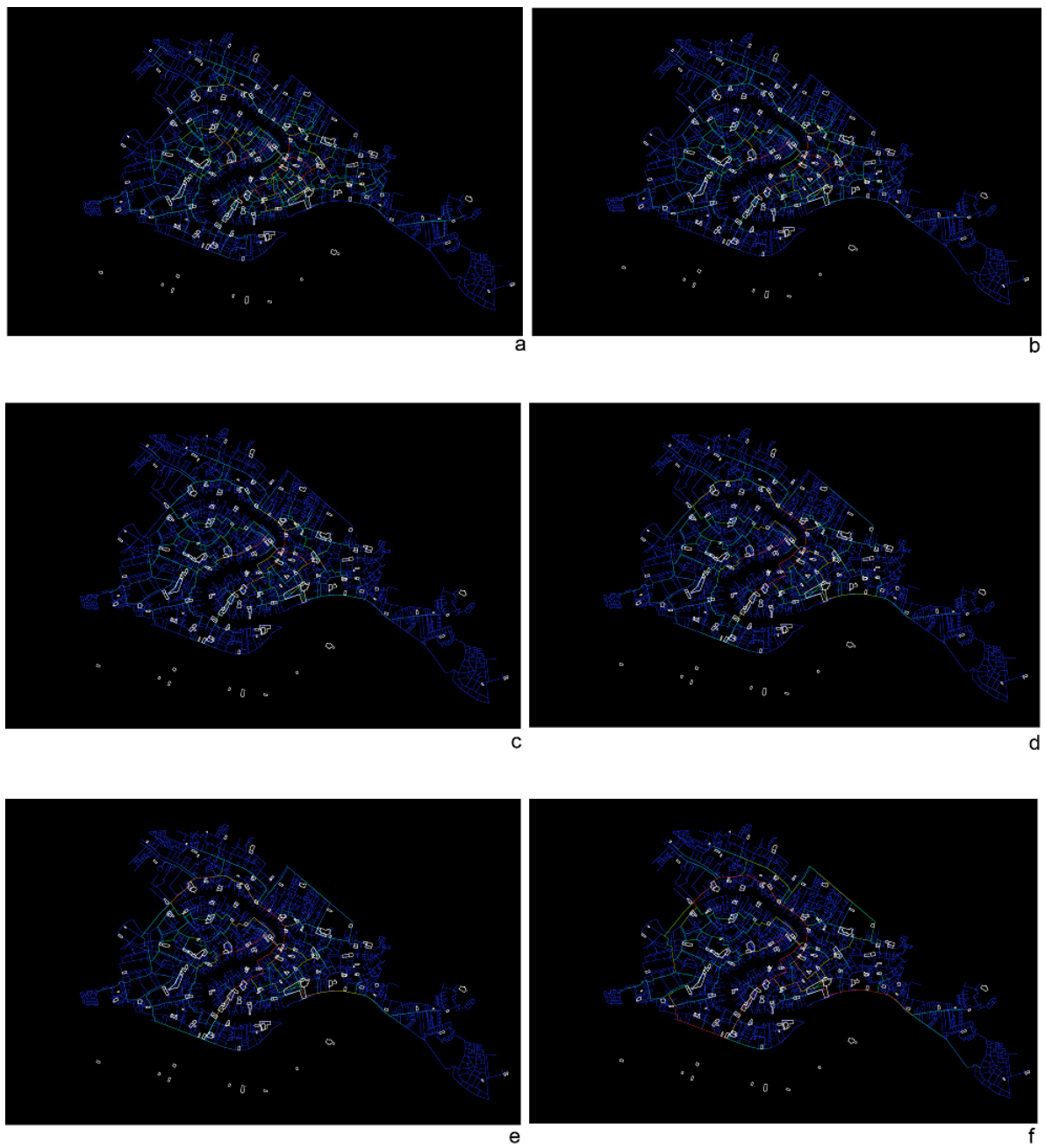


Figure 9a-d

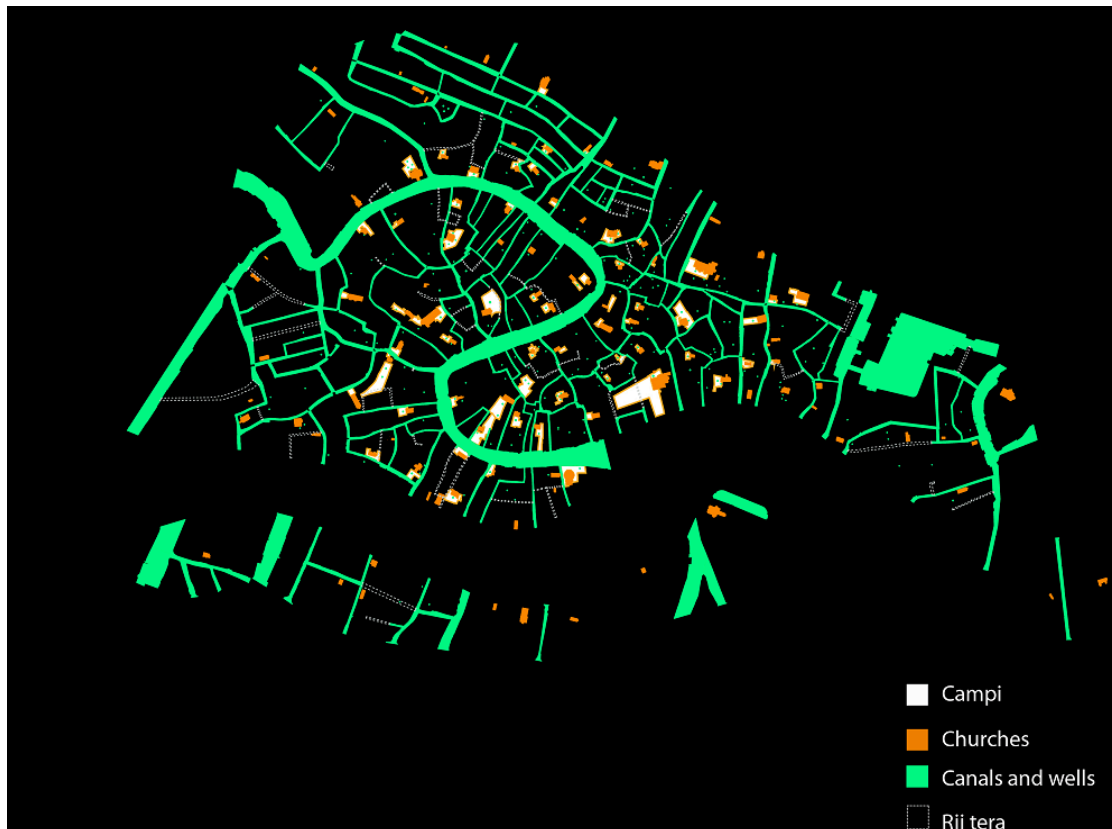


Figure 10

This model of urban growth needs further support by historical documents and longitudinal studies. However, angular choice (at a radius of 2000 metres and above) seems to reinforce this argument (figure 9d-f). Capturing global scale centrality in a distinctive way, it shifts from the interconnected network of squares to large-scale routes connecting Canaregio with San Marco and Dorsoduro as well as those routes extending along the periphery of the city. This shift reflects the transformation that took place in Venice from a collection of autonomous communities with their own parish centre to the global commercial centre - the area around the Rialto - and the civic centre at San Marco. These properties are confirmed by historical research on public ceremonies in Venice. Describing the transformation of rituals from the medieval to the Renaissance period, Muir suggests that in the Quattrocento and Cinquecento the patriciate reduced parochial rituals during which people would parade from one parish-island to another. It thus, suppressed the parishes as constituent groups in public procession so that 'reverence would turn toward the Piazza as an unchallenged centre of attention' (ibid. p. 154). For Muir, the transformation from a scattering of island settlements to a state was clearly a *matter of changing spatial relationships*. These changes brought about the civic ritual - a new dramatic form in Venice<sup>7</sup> - and juxtaposed it with the urban theatre of festivals and rituals of local communities made possible through the interconnected network of streets and squares (ibid. p. 305).

<sup>7</sup> As depicted in the painting by Gentile Bellini (Procession of the New Cross in Piazza San Marco, 1949).



Figure 11

It is crucial though not to exclude a very significant dimension: sea-water runs through the compact body of Venice (figure 10). Extending through bridges over the canals, the pedestrian paths form a separate network from that of the waterways (figure 11). To go from one place to another in Venice you have the choice between land and boat as well as a combination of the two (figure 12). Water travel and pedestrian routes intersect at specific locations through the *targhetti*<sup>8</sup> (that operated at thirteen different points along the Grand Canal, Howard, 2002, p. 45), and a series of stepped access points. Analysing the combined water-pedestrian systems confirms the reasonable expectation that in a city originally made out of island communities large-scale movement would primarily take place through water. As figure 13 shows, global-scale centrality (at a radius  $n$ ) develops along the canals, and not along the pedestrian pathways. However, the analysis reveals that at the local scale the squares are still interlinked through a pattern of interconnections that is denser than previously (figure 13a-b). This means that at the local scale the squares of Venice are *nodes in the intersection of the water network and the street system*. Considering the evolution of the city, this would again seem a reasonable expectation. Since islands were initially separated by water, their squares had to be directly and conveniently serviced by boat in order to transport goods to the market stalls. When at later stages the islands joined, the *campi* became interconnected by a dual transportation system (through water and land) facilitating the unloading and distribution of merchandise and people.

<sup>8</sup> Gondolas that move ferry people across the canals.



Figure 12

As the communities living in these islands became increasingly more prosperous they invested in, repaired and embellished their palaces and churches. The churches that Sansovino, Palladio, Tintoretto and Tiepolo built and painted were not isolated monuments and works of art in history books; they were nodal-monuments demarcating the spaces of intersection between the two networks. When they chimed, rang and sang, the bells, the clocks, the choirs of these churches signalled not only cosmological time, but also synchronic time, that is, the symphony of their interconnections. The liquid and pedestrian routes in Venice interfaced a series of other networks, each facilitating a profusion of flows and people, events, materials, wealth and traffic: an ecological network of marine life, a hydrological network of canals, drainage and navigational channels, a water network of pipes, wells and gutters, an economic network of traders, sailors, shipbuilders, printmakers, glassblowers, artisans, carpenters, glaziers and smiths - a religious network of different orders and scuole grandes. These networks constructed different types of solidarities and co-presence in daily activities as well as in rituals, regattas, carnivals, festivals, processions; the multiplicity of networks that was Venice's *life, theatre and essence*.



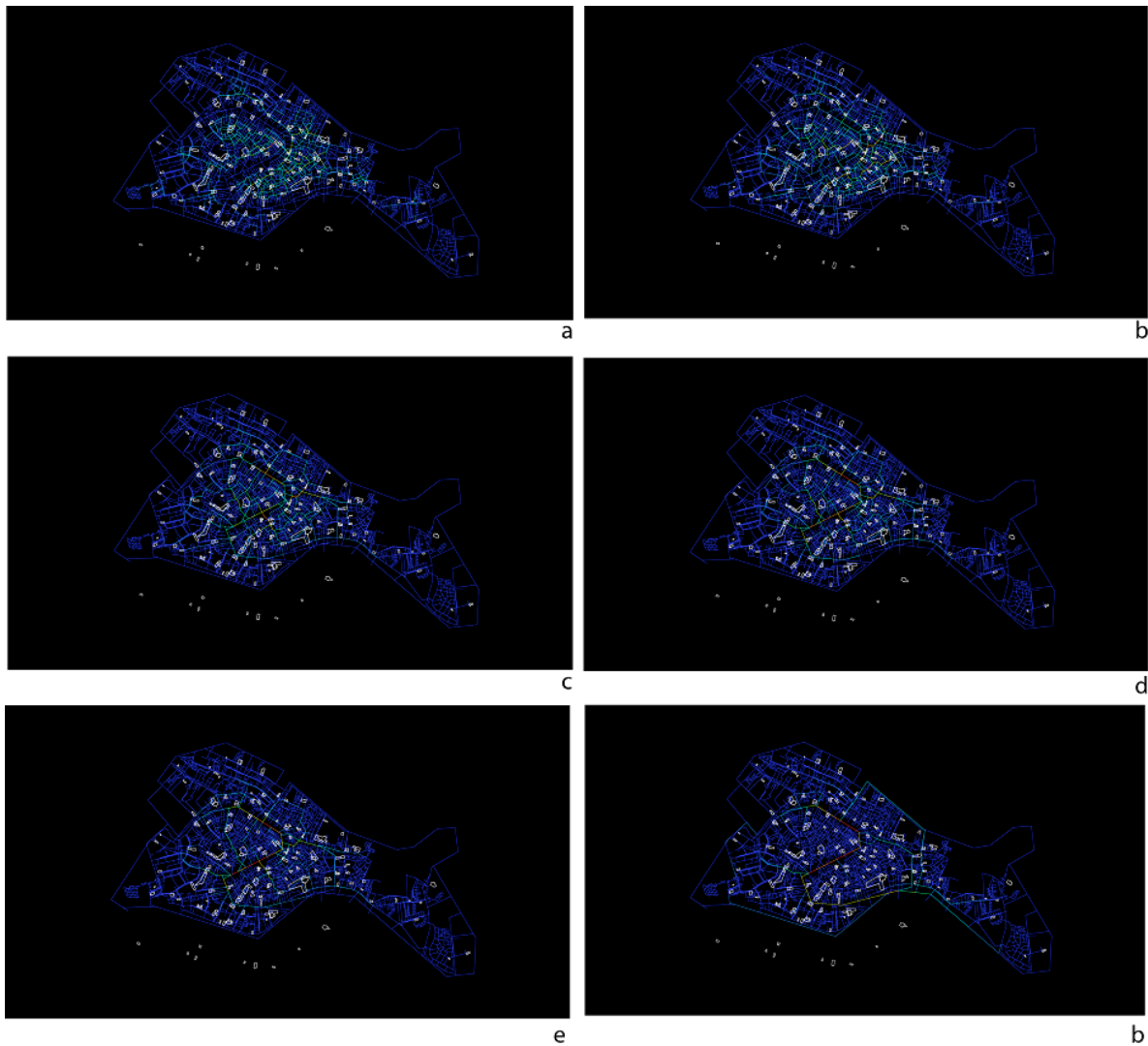


Figure 13a-d

## 6. A HOSPITAL THAT IS LIKE A CITY

A configurational analogy seems to be at work between the interconnected streets and squares of Venice and the network of pathways and square-shaped areas in the Hospital. At the same time, the Smithsons' emphasis on mat-buildings, van Eyck and Blom's concept of the 'organised casbah' and Candilis-Josic-Woods' principles of stems and webs had a direct influence on Le Corbusier and Julian (Mumford, 2001, p. 58). It is important therefore to acknowledge that interconnectedness is a characteristic of the modularity and grid-like characteristics of mat-buildings with their influence from organically grown cities. However, there is one additional property in the Hospital suggesting that it is strongly influenced by the configurational structure of Venice. In order to let natural light reach the inner parts of the design, the architects have used a series of courtyards and patios that are traversed by pathways and bridges. The analysis of axial visibility structure (figure 14) shows that visual integration develops along a set of orthogonal axial lines that cover the pathways, and few long lines that stretch diagonally from side to side.

The square-shaped areas (the centres of the *Unité de batisse*) are the points where the structure of visibility intersects with the structure of movement. This is characteristically expressed by two geometrical systems: one follows the orthogonal geometry of the design; the other is rotated at an angle at the centre of a large rectangle consisting of 9x9 *Unité de batisse*. Like Venice's islands with their dualistic system of water and land linking the urban squares, the square-shaped areas in the Hospital are interfaced by two separate and intersecting structures: visibility and movement.

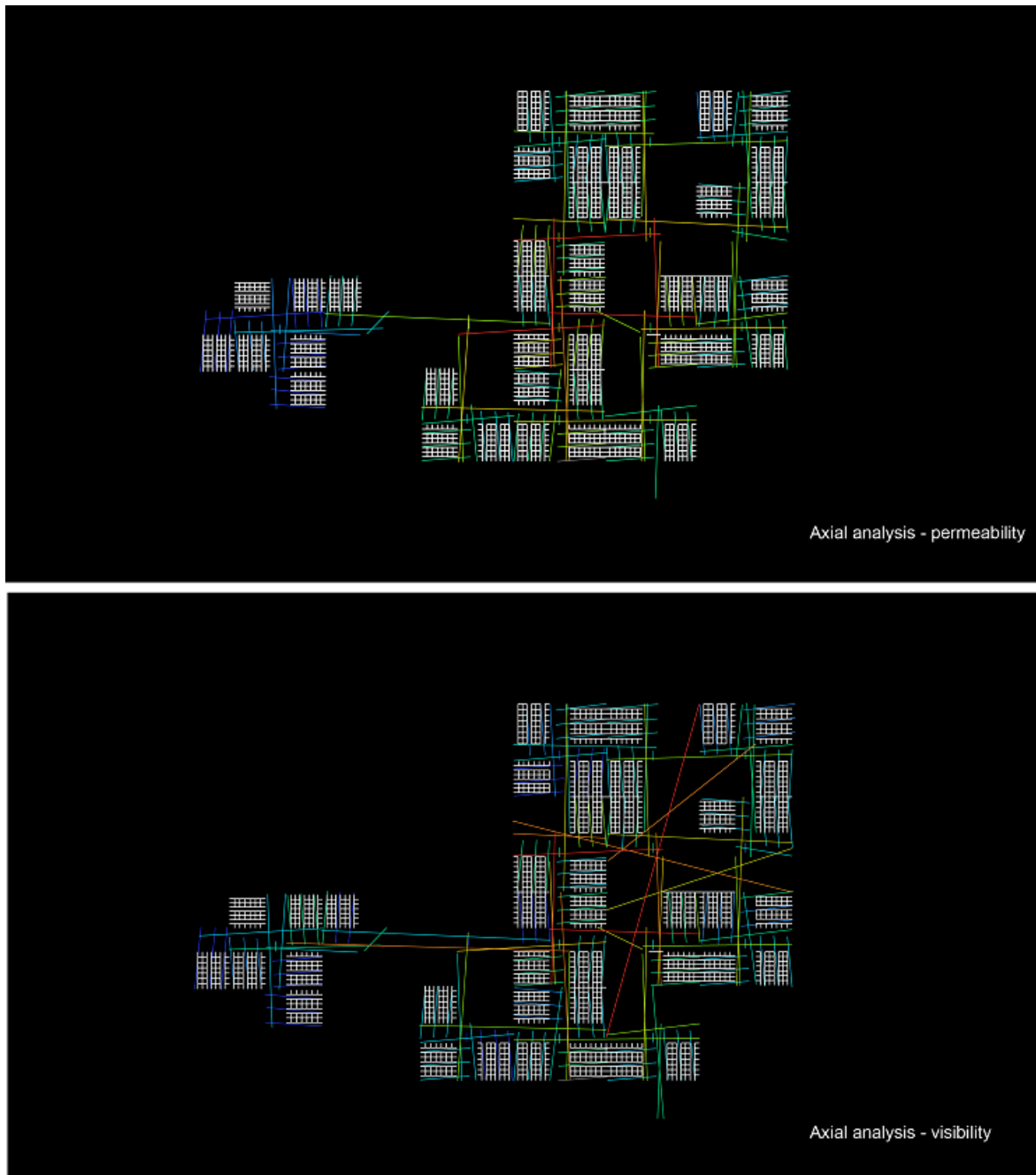


Figure 14



Figure 15

How is this characteristic configurationally possible? A closer look at the *campi* of Venice shows that they are adjacent as well as open to the canals at least on one side – a characteristic that as Howard suggests, is evident from early days and can be also seen in the map of Barbari (ibid. p. 48, figure 16a). If we ‘flood’ the canals and squares with the same colour (figure 16b), we see that the *campi* are not defensibly enclosed areas, but open on one side. Similarly, ten out of fifteen square-shaped spaces (in total) in the Hospital are ‘dematerialized’, that is, not bound by boundaries on all four sides, but open to voids and gardens on two at least sides (figure 17). What Le Corbusier and Jullian captured in Venice through the *campiello*, the *calle*, the patios, the court-yards, the cat-walks, the hanging gardens, were not simply individual types, fragments isolated from the urban fabric, or design typologies from dominant design ideas at the time, but also integral parts of the city and its invisible architecture.



Figure 16a-b

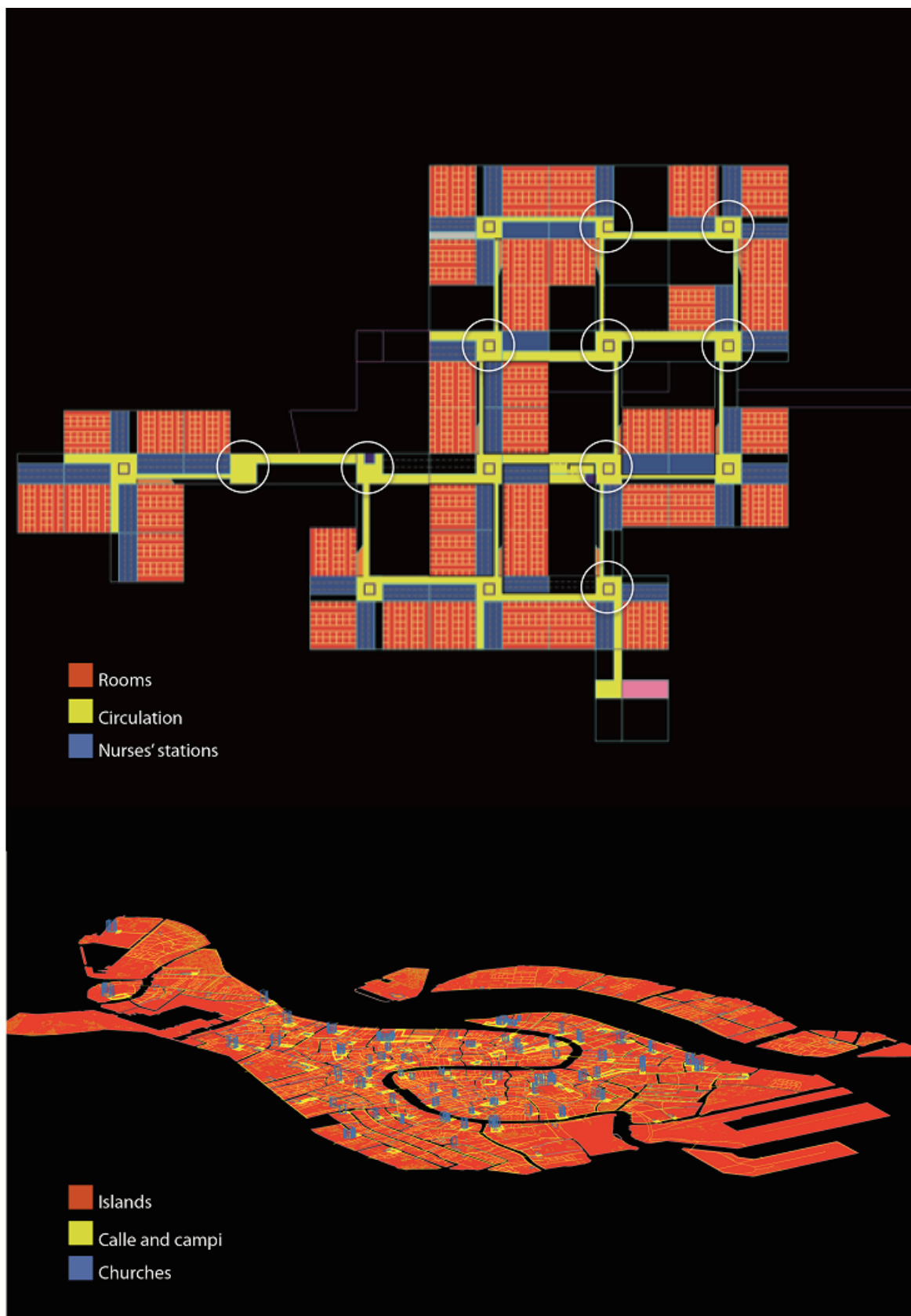


Figure 17



## 7. ORGANIC GROWTH AND CONSCIOUS THOUGHT

The interconnectedness of squares in Venice can illuminate Cornaro's proposal and facilitate a parallel discussion of the two projects. It was suggested that Cornaro renders the structures in the lagoon synchronically visible. In contrast, the Hospital can be experienced only on foot. There is not a single vantage point to see the entire building. Cornaro's abstracts the invisible interconnectedness of churches and squares out of the city's spatial configuration, and makes it visible. In this way, he turns the interlinked monuments of the city into a representation, a spectacular theatre placed over the reflective waters of the lagoon. It is important to stress that this project predates Palladio's San Giorgio Maggiore (1566), the Rendetore (1592), and Santa Maria de la Salute (1631) (Tafari, 1981, p. 158). It thus, prefigures the theatrical treatment of the Bacino that was developing at the end of the century (ibid.). This treatment was part of a deliberate programme of public works in Venice and other Italian cities, such as the reconfiguration of Piazza San Marco and Piazza della Signoria in Florence. Coming out of the medieval heritage of organic patterns and institutions Venice was interfacing its newly discovered consciousness with its unconscious imagination. Le Corbusier and Jullian on the other hand, operate at a time where architects under the influence of Christopher Alexander and Levi-Strauss sought a return to the architecture of the vernacular (Mumford, 2001, p. 63). Based on local rules, mat-buildings from that period simulate patterns of growth similar to those described by Hillier and Hanson in 'beady-ring' vernacular settlements (Hillier and Hanson, 1984, pp. 57-58).

Although entirely different, the two schemes are significant for the history of architecture and urbanism. They capture the close interaction between the emergent self-organising dimensions of cities and the deliberate programmes of architecture, urban design and planning in a characteristic way. This is based on the tension between the configurational systems of visibility and permeability, which Venice a city of intersecting networks of water and land and water exemplifies. But they also share a vision: to transgress the limits of the visible, subtracting the city's invisible substance and translating it into a new structure. *As to functionality, programme and use of technology, at the service of imaginative architecture these are not problems to solve, but opportunities to innovate, as well as wear eloquent garments.* Cornaro sublimates hydrology and technology to 'speak' of a theatre-garden. Le Corbusier and Jullian respond to the science of hospital design and its evolution based on medical innovations. But they also express the idea of evolution as the evolution or urban growth of Venice floating on water, and its architectural poetic dimensions. The architects also referred to the association between the elevated body of Santa Ursula in Carpaccio's painting<sup>9</sup> and the elevated beds in the building. From the patients' bed to the modularity of the Hospital and the organic city a whole, the design parallels the fragility of human life to the fragility of Venice that grew out of water, went from prosperity to decline, facing a continuing threat to perish and die.

## 8. SPACE SYNTAX, CITIES AND ARCHITECTURE

At this point we can turn to the second question raised by this study: *what is the role of analytic theories and practices such as space syntax in architecture and urban design?* To answer this question, it is essential to examine the Hospital in terms of the impact the configurational analogy with the spatial structure of Venice has on the generic functional requirement for intelligibility. The square value of intelligibility in terms of axial permeability is 0.28, raised to 0.51 when visibility is taken into account (Figure 18a-b). In terms of Visibility Graph Analysis, the intelligibility values are 0.41 (at knee level) and 0.73 (eye level) respectively. The second

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<sup>9</sup> 'The Legend of St Ursula: Martydom and Funeral of St Ursula'.



figure reflects the gravitational pull of the voids and the impact of scale into the numerical expression of visual integration (Figure 19a-b). At the level of permeability relations, intelligibility of the building is negatively affected by the compositional pattern, using a large number of relatively short lines that intersect at regular intervals with each other. The interplay between intelligibility and compositional ideas reveals a design approach that modulates and layers experience according to multiple factors such as visibility, permeability, design influences, intentions and poetic expression. *The larger implication is that for the architects the challenge was not how to maximize intelligibility, but how to orchestrate and optimise the relationship among multiple conflicting design parameters.*

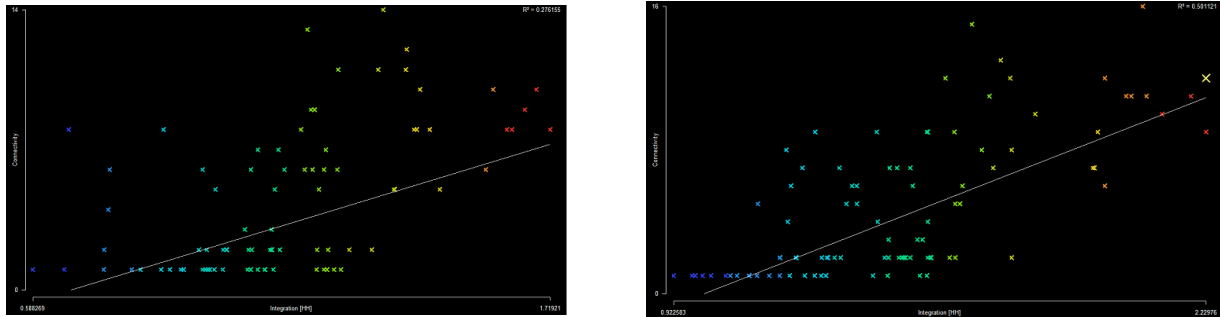


Figure 18a-b

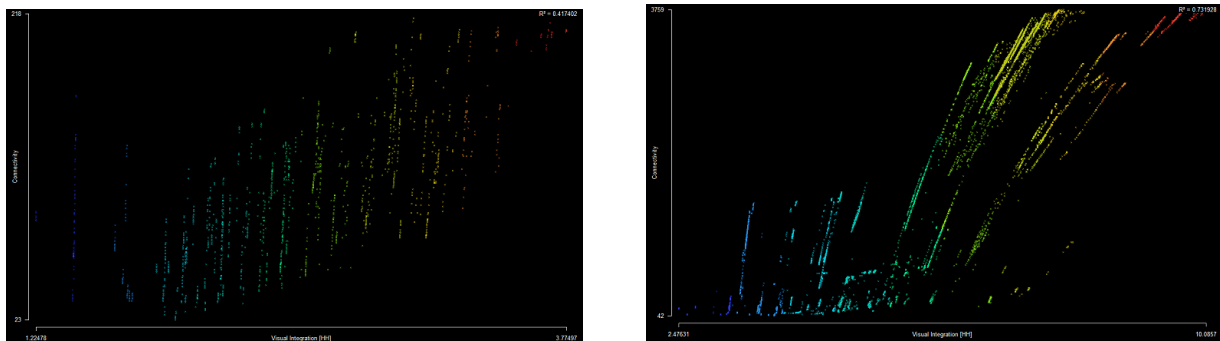


Figure 19a-b

Since its development space syntax has helped to address a wide range of issues of social significance primarily focusing on the instrumental and functional aspects of buildings and cities. While these studies have the capacity to improve the built environment, the question whether they make a contribution to architecture remains widely open. Architecture is not charged with solving functional problems through tried and tested solutions (in a way that is analogous to the vernacular). On the contrary, it is preoccupied with critically considering problems and transgressing from existing knowledge and solutions. This is because it is primarily oriented towards innovation than cultural reduplication (Hillier 1996, p. 33). In so doing, architecture depends on abstract comparative knowledge of previous architecture that evolves over time informing either by difference or repetition new structures. In addition to this knowledge, it uses comparative understanding of buildings and cities from the vernacular, or normalised buildings practices (environments that are created without conscious or critical engagement with reflective practice). Cornaro's

project and the Hospital for example, are clear examples of drawing knowledge and inspiration from previous architectures (antique theatre, classical proportions and so on), and the organic growth and interconnectedness of squares in Venice. Finally, architecture draws information and analogical thinking from a great variety of media and routes, such as theories, photographs, drawings, illustrations, education, memories and associations, art, science, popular culture, in addition to real world experience and the medium of cities and buildings themselves.



Figure 20

To consider whether space syntax can inform even a limited range of these types of knowledge requires an extensive programme of study. However, within the bounds of this analysis it is possible to suggest that it can play a greater role than the improvement of intelligibility and functionality:

First, capturing a close-knit interaction between organically grown patterns and a conscious programme of thought in both projects, this study shows that space syntax can question the boundaries between architecture and the city (aside from using a single theoretical and analytical framework for the study of both). These boundaries are largely responsible for reducing architecture to the design of iconic buildings in isolation from the urban context, and cities to urban policies, regulations and economic development.

Second, the use of space syntax in this study helps to address a conflict, which is sedimented within the theory of space syntax itself (Psarra 2009, p. 28): architecture as the outcome of conscious thought (Hillier 1996, p. 33), and the city as natural self-organising 'emergent processes rather than designed systems' (Hillier and Netto 2001, p. 13.7). As the analysis of the two projects shows, far from being separate and distinct architecture and the city are informing each other and are mutually dependent.

Third, by advancing configurational understanding beyond the immediate confines of the visible, space syntax advances knowledge of possibility. It thus can help to transform reality and influence social change. In

order to do this, it needs to consider a *comparative* and *evolutionary* study of buildings and cities, works of architecture and the vernacular. Through a study of accumulated knowledge of previous architectures, buildings, cities and structures and their development through time – it is possible to identify how spatial patterns repeat through time, the time in which change occurs, and the ways in which it occurs, in order to affect transformation. Space syntax should continue advancing configurational knowledge in the service of building better places for society. But in order to affect social change it should transgress normalised types of knowledge produced by designs and various types of analytical inquiry including its own system of norms, tools, theoretical and analytic assumptions.

## REFERENCES

Addington, M., Kienzl, N., Intrachooto, S. (2001), *Mat Buildings and the Environment*, in Sarkis, H. (ed.), *Le Corbusier's Venice Hospital*, Munich, London, New York: Prestel.

Allard, P. (2001), 'Bridge Over Venice: Speculations on Cross-fertilization of Ideas between Team 10 and Le Corbusier [after a Conversation with Guillermo Jullian de la Fuente]', in Sarkis, H. (ed.), *Le Corbusier's Venice Hospital*, Munich, London, New York: Prestel.

Allen, S., (1997), 'From Object To Field' in *Architecture After Geometry*, Architectural Design Profile No. 127. May-June 1997, pp. 24-32. Reprinted as Allen, S. (1999), 'Field Conditions' in *Points+Lines: Diagrams and Projects for the City*, New York: Princeton Architectural Press

Allen, S. (1999), 'Infrastructural Urbanism', in *Points+Lines: Diagrams and Projects for the City*, New York: Princeton Architectural Press.

Cavino, I. (2009), *Six Memos for the Next Millennium*, London: Penguin Modern Classics.

Calvino, I., (1997), *Invisible Cities*, London: Vintage.

Cobley, P. (2001), *Narrative*, London: Routledge.

Colquhoun, A., (1985), *Essays in Architectural Criticism: Modern Architecture and Historical Change*, Oppositions, Cambridge Mass. and London England: MIT Press.

De Syllas, J. (1999), 'Domestic Asylum: a study of 11 local authority hostels for mentally handicapped people', in 2nd International Space Syntax Symposium: proceedings, 2, University of Brasilia, 45.1 - 45.13.

Eaton R. (2004), *Ideal Cities: Utopianism and the Built Environment*,

Haq, S. and Zimring, C. (2001), 'Just Down the Road a Piece: The Development of Topological Knowledge of Building Layouts', in 3rd International Space Syntax Symposium: proceedings, Georgia Institute of Technology, Atlanta,.

Hillier, B., and Hanson J., (1984), *The Social Logic of Space*, Cambridge: Cambridge University Press.

Hillier B., (1996), *Space is the Machine*, Cambridge: Cambridge University Press.

Hillier B., (2011), 'Is Architectural Form Meaningless? A Configurational Theory of Generic Meaning in Architecture and its Limits', *The Journal of Space Syntax*, Vol. 2, Issue 2, pp.125-153.

- Howard, D., (2005), *The Architectural History of Venice*, New Haven and London: Yale Architectural Press.
- Eisenman, P., (1999), 'Diagram: An Original Scene of Writing', in: Somol., R., E., ed. *Peter Eisenman – Diagram Diaries*, London: Thames & Hudson.
- Kearney, R., (1988), *The Wake of Imagination*, London: Century Hutchinson Ltd
- Kearney, R., (1991), *The Poetics of Imagining - From Husserl to Lyotard*, London: HarperCollinsAcademic.
- Le Corbusier, (2001), 'Rapport Technique', Trans L. Allais, in Sarkis, H., *Le Corbusier's Venice Hospital*, Munich, London, New York, Prestel, Verlag, pp. 36-47.
- MacGregor, N. (2010), *A History of the World in 100 Objects*, London: Penguin Books.
- Mazzariol, G., (1966), 'Le Corbusier in Venice: His Project for a New Hospital', *Zodiac* 16: 241
- Modena, L., (2011), *Italo Calvino's Architecture of Lightness*, London, New York: Routledge.
- Muir, E. (1981), *Civic Ritual in Renaissance Venice*, New Jersey: Princeton University Press
- Mumford, R., (2001), 'The Emergence of Mat of Field Buildings', in Sarkis, H. (ed.), *Le Corbusier's Venice Hospital*, Munich, London, New York: Prestel.
- Penn, A., Desyllas, J., and Vaughan, L. (1999), 'The space of innovation: interaction and communication in the work environment', *Environment and Planning B: Planning and Design*, 26 (2), 193-218.
- Penn, A. (2005), 'The system-user paradox: Do we need models or should we grow ecologies?', Keynote paper to the TAMODIA conference, Gdansk.
- Penn, A. (2005) 'The complexity of the elementary interface: shopping space'. In: A. van Nes (Ed.), *Proceedings, 5th International Space Syntax Symposium*, TU Delft, Netherlands, Techne Press. Amsterdam, The Netherlands.
- Peponis, J., (1997), *Χωρογραφίες: Ο Αρχιτεκτονικός Σχηματισμός του Νοήματος*, Athens: Alexandria Press, (in Greek).
- Peponis, J. & Hillier, B. (1982), *Spatial Choices in the Organisation of Health Centres*, Unit for Architectural Studies, Unpublished Report.
- Peponis, J., Bafna, S., Bajaj, R., Bromberg, J., Congdon, C., Rashid, M., Warmels, S., Yan, Z., and Zimring, C. (2007), 'Designing Space to Support Knowledge Work', *Environment and Behavior*, 39 (6), 815-840.
- Psarra, S., (2009) 'The Ghost of Conceived Space: what kind of work does or should space syntax do for architecture'?
- Ricoeur, P. (1985), *Time and Narrative*, Vol 2, McLaughlin K. Pellauer, D. (trans.), Chicago and London: The University of Chicago Press.
- Ricoeur, P. (1986), *Lectures on Ideology and Utopia*, New York: Columbia University Press
- Smithson, A., (1974), 'How to Recognise and Read Mat-Building: Mainstream Architecture as it Has

Developed Towards the Mat-Building', *Architectural Design* (Sept. 1974): 573-590.

Tafari, M., (1989), *Venice and the Renaissance*, Cambridge Mass.: MIT Press.

Sarkis, H. (2001), *Le Corbusier's Venice Hospital*, Munich, London, New York: Prestel Verlag.

Turner, A., Doka, M., O'Sullivan, A., Penn (2001) 'From Isovists to Visibility Graphs: A Methodology for the Analysis of Architectural Space', *Environment and Planning B*, 28(1).

Woodward, C., (2001), *In Ruins*, London: Chatto & Windus.

## FIGURE CREDITS

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